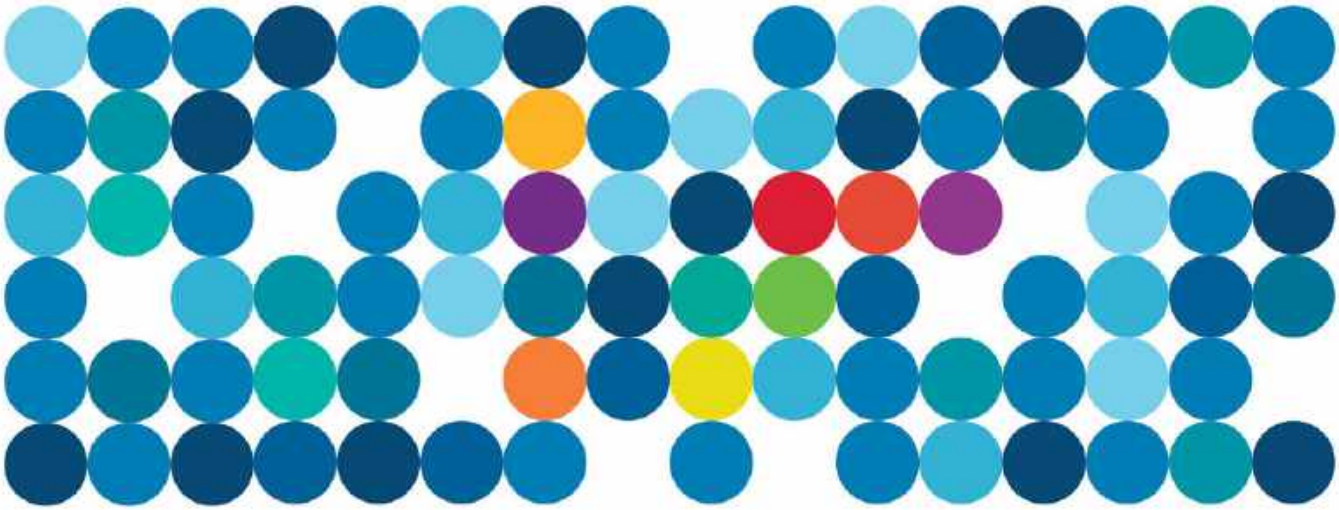
Attachment 8: Works Approval Supporting Document

CS03760 Bridgetown WRRF RDDF Upgrade



WATER CORPORATION

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Acronyms and Abbreviations

BGC	Bridgetown Golf Course
ISD	Irrigation Storage Dam
IDAL	Intermittently decanted aerated lagoon
IDEA	Intermittent Decanting Extended Aeration
mAHD	metres Australian Height Datum
MMF	Multimedia Filters
NTU	Nephelometric Turbidity Unit
OD	Oxidation Ditch
PACL	Polyaluminium Chloride
PDWSA	Public Drinking Water Source Area
RAS	Returned Activated Sludge
RDDF	Rotating Dynamic Disk Filter
SD	Storage Dam
TSS	Total Suspended Soils
TW	Treated Water
WRRF	Water Resource Recovery Facility
WWTP	Wastewater Treatment Plant

1.0 Introduction

1.1 Background

Water Corporation operates the Bridgetown Water Resource Recovery Facility (WRRF) under Licence L7440/1998/7 Licence for the following prescribed premises categories under Part V of the *Environmental Protection Act 1986* (EP Act):

- *54: Sewage facility premises –*
  - *On which sewage is treated (excluding septic tanks); or*
  - *From which treated sewage is discharged onto land or into waters.*
- *61: Liquid waste facility: premises on which liquid waste produced on other premises (other than sewage waste) is stored, reprocessed, treated or irrigated.* (*Environmental Protection Regulations 1987)*

Bridgetown WRRF treats wastewater to a tertiary standard via an Oxidation Ditch-type activated sludge (OD) plant, multimedia filtration (MMF) and a chlorine disinfection plant. The facility also includes two lined sludge stabilisation lagoons and a treated wastewater (TWW) irrigation storage dam (ISD) (Attachment 2, Figure 1). The leachate supernatant from the sludge stabilisation lagoons is recycled back to the treatment plant and the dried sludge, once it has been dewatered, is disposed of offsite at an approved facility. Following filtration and disinfection, the TWW is used to irrigate the nearby Bridgetown Golf Course (BGC).

Operational and environmental monitoring at the WRRF comprises:

- Continuous flow monitoring of incoming wastewater and outgoing TWW.
- Monthly sampling of TWW quality.
- Groundwater monitoring around the operation.

It should also be noted that the existing Intermittently decanted aerated lagoon (IDAL) reactor was re-purposed into a continuous inflow OD-type reactor.

1.2 Proposed Treatment Upgrade

In 2017, the Bridgetown WRRF aeration upgrade was undertaken to provide an optimised process configuration, aeration, and control to ensure nutrient removal and minimise solids loss to the dam. The upgrade was unable to achieve expected TWW quality. An analysis of the mixed liquor identified the presence of an almost pure culture of Type 0092 filamentous bacteria. This type of bacteria contributes to a sludge which causes severe bulking (Metcalfe and Eddy, 2003, p.695), and process mixed liquor does not compact or settle well.

Due to the filamentous bacteria, TWW Total Suspended Solids (TSS) consistently exceeded 30 mg/L and Operators noticed sludge build-up in the clarifier section of the new plant. The process was reseeded with healthy sludge several times without success and solids retention in the process remained an ongoing problem.

Inadequate retention of process solids from TWW was contributing to excess solids discharge to, and promotion of algal growth in the ISD. The algae required chemical treatment to ensure that suspended solids did not exceed the reuse system filtration capacity.

Several potential solutions to control the settlement issue have been trialled by Water Corporation. A Rotating Dynamic Disk Filter (RDDF) phase-separation system that functions as a dynamic microfilter was found to provide the most effective retention of biomass in the process and the highest quality of TWW.

An on-site pilot trial of an 8 m^2 (4 disks x 2 m^2) RDDF system was authorised under an amendment to Licence L7440/1998/7, granted in 2021. The trial was conducted for a period of 12 months commencing in February 2021. Over the period, 16 February – 22 April 2021, the RDDF pilot system produced TWW with an average TSS of 32 mg/L and, following further system improvements, produced TWW with an average TSS of 17 mg/L over the period 16 September – 16 November 2021.

1.3 Project Overview

Following the pilot RDDF trial, Water Corporation proposes to upgrade the Bridgetown WRRF by installing a 24 m^2 (8 disks x 3 m^2) RDDF system to replace the existing internal clarifier. The high quality of the RDDF TWW will enable optimisation of the existing TWW reuse scheme. TWW from the RDDF will be disinfected and stored in a new contact tank for direct supply to the Bridgetown Golf Club (BGC). Excess water will be stored in the dam and provided for reuse if required by BGC, after filtration, disinfection, and blending with RDDF TWW in the new contact tank.

The relevant prescribed premises categories for the proposed upgrade are listed in Table 1. It is noted that no change in production or design capacity is sought in this application.

Table 1: Prescribed Premises Categories for this Works Approval

Classification of Premises	Description	Category production or design capacity	Approved premises production or design capacity
54	Sewage facility premises – a) On which sewage is treated (excluding septic tanks); or b) From which treated sewage is discharged onto land or into waters.	100 cubic metres or more per day	520 cubic metres per day
61	Liquid waste facility: premises on which liquid waste produced on other premises (other than sewerage waste) is stored, reprocessed, treated or irrigated.	100 tonnes or more per year	1000 tonnes per annual period

1.4 Premises Description

The prescribed premises is located approximately 217 km south of Perth and approximately 5 km north of the township of Bridgetown, in Hester Brook Western Australia and covers approximately 75 ha on Lot 10438 on Plan 153767 as shown in Figure 1 of Appendix A (Attachment 2).

An indicative site layout showing the prescribed premise boundary, location of key infrastructure, overall general layout, emission and discharge points, and sensitive receptors is shown in Section 6, (Attachment 7).

1.5 Licence History

Part V operational licence L7440 was first issued in 1998 and was then re-issued in 2009. Several amendments have been made to L7440 since it was re-issued in 2009 (Table 2). Recent amendments were in 2021 authorising the trial of the pilot RDDF system and 2024 to remove TSS from monitoring requirements.

Table 2: Licence History for Bridgetown WWTP

Date	Reference Number	Summary of Changes
29/10/2009	L7440/1998/6	Licence reissue
12/05/2011	L7440/1998/6	Licence amendment to remove reference to some groundwater bores no longer considered necessary
23/10/2014	L7440/1998/7	Licence reissue in old format
22/01/2015	L7440/1998/7	Licence amendment to REFIRE format
6/04/2018	L7440/1998/7	Amendment Notice 1 to capture newly drilled monitoring bores and alter S1 monitoring point description.
23/07/2021	L7440/1998/7	Licence amendment to authorise trial of new filtration system and update to new standard format
28/06/2024	L7440/1998/7	Department initiated amendment to remove Total Suspend Solids monitoring for Bores 03/17, C and 05/17.

2.0 Environmental Setting

The site is located within the Jarrah Forest Interim Biogeographic Regionalisation for Australia (IBRA) region, and the Southern Jarrah Forest subregion, which is characterised by Jarrah-Marri Forest in the west grading to Marri and Wandoo woodlands in the east (Hearn et al., 2002). There are extensive areas of swamp vegetation in the south–east of this IBRA region, dominated by Paperbarks and Swamp Yate. The majority of the diversity in the communities occurs on the lower slopes or near granite soils where there are rapid changes in site conditions (Hearn et al., 2002).

2.1 Climate

The site is within a warm Mediterranean climate. The nearest long-term Bureau of Meteorology (BoM) weather station with recent data is Bridgetown (Station 009617), located approximately 4.6 km south of the site (BoM, 2023). The mean annual maximum and minimum temperatures from 1998 to 2023 are 22.4^{0}C and 8.6^{0}C, respectively (BoM, 2023). The long-term average rainfall in the

area from 1998 to 2023 is 731.4 mm per year and the average annual rain days for the station is 158 (BoM, 2023).

2.2 Topography

Elevation in the prescribed premise ranges between approximately 270 metres Australian Height Datum (mAHD) to 288 mAHD from north to south, and peaks around the centre of the site at 288 mAHD (Google Earth Pro, 2015). Elevation ranges between 275 mAHD to 295 mAHD, from west to east, peaking around the centre of the site (Google Earth Pro, 2015).

2.3 Geology and Soils

The site is within the Western Darling Range Zone which is described as moderately dissected lateritic plateau on granite with deeply incised valleys, includes the Darling Scarp on the western margin (DPIRD, 2022a). Soils are formed in laterite, lateritic colluvium and weathered in-situ granite and gneiss (DPIRD, 2022a).

The site is within the Darling Plateau System which is described as Lateritic plateau with duplex sandy gravels, loamy gravels and wet soils and Jarrah-marri-wandoo forest and woodland (DPIRD, 2022b).

2.4 Hydrology

The site is located within the Karri groundwater area (DWER, 2023b) and the Middle Blackwood surface water management area (DWER, 2018).

The closest Public Drinking Water Source Area (PDWSA) is the Hester Dam Catchment Area (Priority 1), located approximately 800 m to the east of the site (DWER, 2023a).

3.0 Proposed Activities (Attachment 3B)

3.1 Infrastructure – Construction aspects

As part of the proposed upgrade project, the RDDF system will be integrated within the existing Bridgetown WRRF, to replace the existing internal secondary clarifier. The following components are required for this upgrade:

- 24m^2 RDDF facility (8 disks x 3m^2), comprising a feed pumpstation including aeration, concrete RDDF tanks, and RDDF backwash system.
- Existing clarification zone to be retained as ‘emergency off-line storage zone’ – This is part of the OD structure so cannot be removed.
- New bunded chemical storage and dosing systems for Polyaluminium chloride (PACL) and liquid Sodium Hypochlorite. The existing Sodium Aluminate storage and dosing system replaced with Polyaluminium Chloride storage and dosing system. This chemical is required both for filter system performance and chemical phosphorus removal.

  The addition of a new Sodium Hypochlorite storage and dosing system for filter backwashing and site reuse water disinfection. MSDS’s are included in Appendix B.
- New service water storage tank and relocated service water pumpstation.

- Relocated potable water storage and pressure supply system for operations building and safety eyewash stations.
- New 300 kL contact tank located adjacent the existing TWW reuse facility at the base of the ISD. Existing gas chlorination system will be reconfigured to discharge into this tank.
- Civil works, interconnecting pipework, valves, electrical, instrumentation, control and operational technology infrastructure to facilitate integrate and operation of the new facilities.
- Site clearance and earthworks

No clearing of native vegetation is required. The only clearing that may take place is <0.1 ha of planted Blue Gums on the prescribed premises, to facilitate installation of a TWW transfer pipeline. The Blue Gums were not required to be planted under the *Environmental Protection Act 1986* (EP Act) or other legislation, nor were they planted for conservation purposes. The planted Blue Gums are, therefore, not considered to meet the definition of native vegetation under the EP Act.

3.2 Operations activities

The existing WRRF operates with the OD plant, including the internal clarifier, which treats used water to a secondary standard. Water Corporation intends to install the RDDF system as a separate fixed structure and decommission the internal clarifier. Clarifier will be retained as emergency storage. See Plate 1 for proposed upgrades which are subject of this works approval application. These will be undertaken offline and will not materially impact normal plant operations.

The process flow for the upgraded WRRF as shown in Plate 1 is as follows:

- Inflow will be directed from the Inlet Works into the OD reactor.
- Mixed liquor is pumped from the OD to the RDDF system for phase separation of biomass and TWW.
- TWW from the RDDF will either:
  a) be discharged to the 300kL Contact Tank for disinfection and storage, before reuse by BGC (in drier months), or
  b) be discharged to the ISD to be stored until required. If extra TWW is requested by BGC, stored water will be discharged to the existing 54kL balance tank and filtered passed through the existing MMF before transfer to the Contact Tank for reuse by BGC.
  c) used to fill RDDF backwash tank and site service water tank.
- Sludge from the RDDF will be recycled to the aerobic zone of the OD as Return Activated Sludge (RAS) as per the existing clarification system.
- Excess process solids (sludge) will continue to be directed to the sludge lagoons for stabilisation and periodic dewatering before removal to a suitably licensed facility.
- Supernatant from the sludge lagoons will continue to be recycled to the treatment plant.

Plate 1: Process flow diagram incorporating the proposed RDDF (179809870)

			STREAM																						
			USED WATER FLOW	OPS BLDG WASTE	INLET WORKS PSTN	TOTAL WATER FLOW	POST PRELIM TREATMENT	'R' RECYCLE DUTY	SELECTOR INLET SPLIT	SELECTOR OUTLET SPLIT	TOTAL SELECTOR OUTFLOW	INTERNAL 'A' RECYCLE	'R' RECYCLE RANGE	WAS PUMP DUTY	'S' PUMP DUTY	RDDF FEED RATE	'S'/WAS DUTY	RDDF TREATED WATER	TOTAL TREATED WATER	SERVICE WATER DUTY	REUSE PSTN DUTY	REUSE WATER SUPPLY	REUSE BACKWASH FLOW	D-NITRO SUCROSE DOSING	PACL DOSING	HYPO DOSING	WAS SUPERNATANT
	No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
DESIGN VALUE	UNITS																										
RATE OF CHANGE*	(L/s)		25–28	2,0	8,2–10,3	35,2–40,3	35,2–40,3	5,0–10,0	2,5–5,0	2,5–5,0	30,0–38,0	250–500	5,0–10,0	5,0–11,0	5,0–12,0	3,0–8,0	5,0–7,0	1,0–5,3	15,0	3,0	15,0	15,0	–	–	–	–	5,0–7,0
	(L/h)		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	54,0	–	54,0	54,0	–	–	–	0–12,0	–

* EQUIPMENT CAPABILITY

LEGEND:

- NEW WORKS.
- EXISTING WORKS UPDATED TO AS CON.
- PRIMARY STREAM.
- SECONDARY STREAM.
- CHEMICAL DOSING.
- SOLIDS WASTE.

TANKER RECEIVAL
CHEMICAL DELIVERY BUND
POLY-ALUMINIUM CHLORIDE
D-NITRO SUCROSE
CHEMICAL STORAGE BUND
SODIUM HYPOCHLORITE
CHLORINE GAS CL2
WATER REUSE PSTN
MEDIA FILTERS
BRIDGETOWN GOLF COURSE
REUSE BALANCE TANK 54kL
REUSE STORAGE TANK 300kL
STORAGE DAM
RDDF No.1
RDDF No.2
RDDF FEED PSTN
SERVICE WATER STORAGE
SERVICE WATER PSTN
SERVICE WATER NETWORK
BRIDGETOWN CONVEYANCE
INLET CHAMBER
MACERATING PUMP
INLET SCREEN
GRIT REMOVAL
REACTOR SELECTOR ZONE
REACTOR AEROBIC ZONE
OFFLINE STORAGE
REACTOR ANOXIC ZONE
COMPACTING BIN
TO SOLIDS DISPOSAL
SPLITTER BOX
'S' RECYCLE PUMP
'R' RECYCLE PUMP
WAS PUMP
SLUDGE LAGOON No.1
SLUDGE LAGOON No.2
TO SOLIDS DISPOSAL
OPERATIONS BUILDING PSTN
INLET WORKS PSTN

ISSUE	DATE	GRID	REVISION	DRN	REC	APPD

DESIGN SURVEY NONE
VERTICAL DATUM NONE
COORDINATE SYS NONE
ASCON SURVEY NONE
DES REF
DES CALC
DES CHD
DRN B. JEFFERS
Q.C. CHD
NORTH POINT

ENGINEERING

RECOMMENDED
SENIOR ENGINEER WRR
APPROVED
SENIOR PRINCIPAL ENGINEER WRR

WATER CORPORATION

BRIDGETOWN WASTEWATER
WASTEWATER TREATMENT PLANT No.2
SITE WIDE
PROCESS FLOW DIAGRAM (PFD)

FILE
PROJECT CS02898
PLAN FB55–34–5
CAD
ISSUE A
ORIGINAL SHEET SIZE A1
MF

CAD MANAGEMENT_NOT READ ONLY\WWT\SWR\BRIDGETOWN WWTP\001_WWTP_PROJECT FILE AND FOLDERS TEMPLET\34_HYDRAULIC_PROFILE\SS\FB55-034-004-01A 09:38 29/05/2024 JEFFERB1/WS33978

566
810

3.3 Environmental Commissioning Plan (Attachment 3A)

Environmental commissioning of the upgraded WRRF will be required for testing and optimising RDDF operation to ensure that TWW will achieve an average TSS of 20 mg/L. Environmental commissioning commences immediately after the RDDF and associated sub-systems have been integrated into the WRRF.

The following environmental commissioning activities will be required:

- Reliability test (30 days) – all systems set to AUTO, no intervention by Operator.
- Process proving (60 days) – optimisation of system settings, such as RDDF speed, RAS rates, backwash frequency, air scour frequency etc.
- Performance testing (60 days) – testing of optimised facility on AUTO, routine Operator intervention only, to confirm systems meet performance specifications.

Mixed liquor, as per current operations, will be the input stream during environmental commissioning. Output streams during environmental commissioning will be TW (up to 520 kL/day as per L7440/1998/7) and sludge as per the existing operation (Table 3).

Table 3: Emissions and Discharge Points

Emission	Discharge Point	Discharge Point Location
Treated wastewater	Outlet from contact tank	Point S2 as shown in Figure 1
Sludge	Sludge drying pond	As shown in Figure 1

Monitoring of the TWW will be undertaken as required by L7440/1998/7 for the parameters and frequencies as shown in Table 4 below. Monitoring of groundwater will also continue as per the requirements of L7440/1998/7.

Table 4: Monitoring of Emissions to Land

Emission point reference	Monitoring Point Reference	Parameter	Units	Averaging Period	Frequency
S1	Meter at inlet to the OD Basin	Volumetric flow	L/s or m^3/day	Monthly	Continuous
S2	Outlet from contact tank (representative of irrigation).	pH		Spot sample	Monthly
		Biological Oxygen Demand	mg/L	Spot sample	Monthly
		Total Dissolved Solids	mg/L	Spot sample	Monthly
		Total suspended solids	mg/L	Spot sample	Monthly

		Nitrate + Nitrite nitrogen	mg/L	Spot sample	Monthly
		Ammonium nitrogen	mg/L	Spot sample	Monthly
		Total Nitrogen	mg/L	Spot sample	Monthly
		Total Phosphorus	mg/L	Spot sample	Monthly
	Magflow metre to Bridgetown Golf Club	Volumetric flow rate (cumulative)	l/s or m^3/day	Monthly	Continuous
		Escherchia coli	cfu/100 mL	Spot sample	Monthly (when discharging)

4.0 Emissions and Pathways (Attachment 6A)

Potential emissions during construction, commissioning and operation of the WRRF upgrade are noise, dust, odour, seepage to groundwater and uncontrolled discharge of wastewater or chemicals.

Other than improving the quality of the TWW, the upgrade of the WRRF will not result in any changes to emissions and discharges during operations from those identified in the original licence.

Table 5: Emissions and Discharges

Source of emission or discharge	Potential emission	Potential Pathway	Volume / Frequency	Proposed Controls	Location
Construction activities during upgrade of the WRRF	Noise	Air/ windborne	Daily during construction	• Construction works to be undertaken between the hours of 7am and 7pm, Monday to Saturday • Compliance with the *Environmental Protection (Noise) Regulations 1997*	Prescribed Premises
	Dust	Air/ windborne	Daily during construction	• Most construction activities will occur on hardstand areas • Vehicle speed limit of 20 km/hour on unsealed areas • Regular dust suppression on unsealed areas.	Prescribed Premises
Commissioning/ operation of the upgraded WRRF	Noise	Air/ windborne	Daily during operations	• Compliance with the *Environmental Protection (Noise) Regulations 1997*	Prescribed Premises
	Odour	Air/ windborne	Daily during operation	• Treatment process includes extended aeration of the wastewater which reduces odour • Continue to transfer sludge to the sludge ponds to facilitate drying of the sludge which reduces odour	WRRF
	Discharge of insufficiently treated wastewater	Irrigation to BGC	Rare – equipment failure only	• Plant upgrade to include RDDF • Monitoring of treated wastewater quality	WRRF
	Uncontrolled discharge of chemicals	Overland flow	Rare – equipment or storage failure only	• Hazardous chemicals and hydrocarbons stored in bunded areas compliant with AS1940 and AS3780 • Spill kits, containment and recovery equipment, operator instructions and emergency procedures • Waste products stored in appropriate rubbish bins and removed from site by the contractor regularly • All semi-mobile equipment fitted with spill kits	WRRF

Source of emission or discharge	Potential emission	Potential Pathway	Volume / Frequency	Proposed Controls	Location
				• Suitably trained staff • Regular maintenance and servicing of equipment and vehicles • Hardstand areas created will be sufficiently graded and bunded to contain spills • Procedures and training for the use and handling of chemicals and maintenance regimes for bunds and associated control equipment	
	Contaminated stormwater	Overland flow following contact with contamination in the plant area	Rare – equipment or storage failure	• Chemical storage areas are bunded so stormwater runoff cannot flow into them • Stormwater incident in bunded areas will be allowed to evaporate or will be removed for disposal at a licensed facility	WRRF
Sludge ponds	Supernatant	Seepage to groundwater	Rare – storage failure only	• Existing lined sludge ponds • Return of supernatant to plant via pipeline • Continue to monitor groundwater for potential contaminants	Sludge ponds
	Uncontrolled discharge of wastewater	Overtopping of sludge pond	Rare – equipment/ storage failure only	• Return of supernatant to plant	Sludge ponds
	Sludge	Contamination of soil	Rare – storage failure only	• Lined sludge ponds • Continue to remove sludge for disposal offsite at a licensed facility	Sludge ponds

5.0 Consultation (Attachment 6A)

Consultation has been undertaken with the Department of Water and Environmental Regulation (DWER) in relation to the need for improved performance from the WRRF since 2014, including correspondence in 2019 following a DWER site inspection and approval of a Licence Amendment in 2021 to enable the trial of the RDDF. The existing Licence acknowledges that an application will be required to extend the trial of the RDDF to a permanent feature.

6.0 Siting and location (Attachment 7)

Under the GS3 guidance on separation distances between industrial and sensitive land uses, the proposal fits within the 'Wastewater treatment plant' category (EPA, 2005). There is no recommended separation distance for this category as buffer studies are in progress to determine appropriate separation distances (EPA, 2005). Environmental and human receptors occurring within a 5 km buffer of the prescribed premises are listed in Table 1, they are consistent with the existing licence L7440/1998/7, impacts to adjacent receptors remain unchanged.

Table 6: Sensitive receptors within a 5 km radius of the site

Type / Description		Description / Distance from Site Boundary
Human Receptors		
Residential / commercial		~ 150 m south of the premises boundary. Adjoining Lot Bridgetown Golf Club
General farming zone		Adjacent to the western and northern premise boundaries
Licenced premises	L7737/2001/6 – Bridgetown Golf Club	Adjacent Lot south-east of the premises boundary
	L6437/1990/11 – Timber Treaters Bridgetown (WA) Pty Ltd	~ 2.3 km east of the premises boundary
	L6818/1997/11 – Shire of Bridgetown Greenbushes	~ 4.3 km south-east of the premises boundary
Environmental Receptors		
Environmentally Sensitive Areas (ESAs)		The site is not within a mapped ESA.
Threatened Ecological Communities (TECs)		The Protected Matters Search Tool (PMST) identified one (1) TEC as potentially occurring within a 5 km radius of the site – Empodisma peatlands of southwestern Australia (DCCEEW, 2024). No specific controls are required as the site has already been cleared and controls are already in place to minimise potential for contaminated overland

		flows or seepage to groundwater to occur. The proposed upgrade will, therefore, not impact any occurrences of the TEC that may be present.
Threatened and/or priority fauna		From previous DWER Licence Amendment (L7440/1998/7): • *Phascogale tapoatafa wambenger* – 1.8 km south-east • *Zanda latirostris* (Carnaby's Cockatoo) – 2.5 km east • *Tyto novaehollandiae* 1.3 km north The PMST search identified 12 Threatened fauna species within a 5 km radius of the premises boundary (DCCEEW, 2024). Of these, 4 species are Known to occur: • *Zanda baudinii* (Baudin's Cockatoo) • *Zanda latirostris* (Carnaby's Cockatoo) • *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo) • *Dasyurus geoffroii* (Chuditch, Western Quoll) No specific controls are required as the site has previously been cleared and is unlikely to include habitat suitable to support threatened and/or priority fauna.
Threatened and/or priority flora		The PMST search identified three (3) orchid species potentially occurring within a 5 km radius of the site (DCCEEW, 2024): • *Caladenia harringtoniae* (Likely to occur) • *Caladenia hoffmanii* (Likely to occur) • *Diuris micrantha* (May occur) No specific controls are required as the site has previously been cleared and is unlikely to include habitat suitable to support threatened and/or priority flora.
Aboriginal and other heritage sites		The nearest registered Aboriginal Heritage place is the Blackwood River (ID 20,434), located approximately 1.8 km to the east of the site (DPLH, 2023).
Public Drinking Water Source Areas		The nearest PDWSA is the Hester Dam Catchment area, located approximately 800 m east of the site (DWER, 2023a).
Bodies of surface water:	Hester Dam Catchment	~ 800 m east of the site
	Hester Brook/Dalgarup Brook	~ 1.8 km west of the site
	Unnamed surface waterbody	~ 1.6 km south-east
Acid sulfate soils (ASS)		The premises is located within an area of extremely low probability (1-5% chance) of ASS occurring (Fitzpatrick et al., 2011).
Contaminated sites		There is a "Remediated for restricted use" site (No. 17,367) located approximately 2.2 km east of the premises boundary (DWER, 2024). There is a "Contaminated – restricted use" site (No. 34,013) located ~4.4 km north-west of the premises boundary (DWER, 2024).

7.0 Cost Calculation (Attachment 10)

The proposed works approval fee has been calculated at **$13,252.25** based on the cost of works provided in Table 7, and the capacity range of 'more than 200 but not more than 2,000 cubic metres per day' for Category 54 prescribed premises.

Table 7: Cost Breakdown

Upgrade	Cost
RDDF Upgrade	
Chemical Storage and Dosing	
Rotating Dynamic Disc Filter (RDDF)	
RDDF Feed Pump Station	
Service Water Facility	
Pipework and Valves	
Electrical Installation	
Instrumentation and OT	
Contractor Preliminaries and Commissioning	
Total Contract Sum	
Reuse Tank Upgrade	
Siteworks (including removal of 54 kL tank)	
Tank	
Modify Pipework	
Install DN80 flow meter on the inlet to tank	
Chlorine analyser for accurate measurement of Free Chlorine	
Installation of rotameter for existing chlorinator	
280 m DN90 Pipe (from WWTP to Chlorine/Reuse building)	
Modify PLC programming	
Contractor Preliminaries and Commissioning	
Total Contract Sum	
Total	

8.0 References

Bureau of Meteorology. (2023). Climate statistics for Australian locations – Summary statistics BRIDGETOWN. Available at http://www.bom.gov.au/climate/averages/tables/cw_009617.shtml

Department of Climate Change, Energy, the Environment and Water [DCCEEW]. (2024). Protected Matters Search Tool. DCCEEW. Available at https://pmst.awe.gov.au/#/map?lng=131.52832031250003&lat=-28.6905876542507&zoom=5&baseLayers=Imagery,ImageryLabels

Department of Planning, Lands and Heritage [DPLH]. (2023). Aboriginal Heritage Places (DPLH-001) – GIS Dataset. Available at https://www.data.wa.gov.au/

Department of Primary Industries and Regional Development [DPIRD]. (2022a). Soil Landscape Land Quality – Zones – GIS Dataset (DPIRD-017). Available at https://www.data.wa.gov.au/

Department of Primary Industries and Regional Development [DPIRD]. (2022b). Soil Landscape Mapping – Systems – GIS Dataset (DPIRD-064). Available at: https://www.data.wa.gov.au/

Department of Water and Environmental Regulation [DWER]. (2018). Surface Water Management Areas (DWER-041) – GIS Dataset. Available at https://www.data.wa.gov.au/

Department of Water and Environmental Regulation [DWER]. (2023a). Public Drinking Water Source Areas – GIS Dataset (DWER-033). Available at https://www.data.wa.gov.au/

Department of Water and Environmental Regulation [DWER]. (2023b). WRIMS – Groundwater Areas – GIS Dataset (DWER-085). Available at https://www.data.wa.gov.au/

Department of Water and Environmental Regulation [DWER]. (2024). Contaminated Sites Database (DWER-059) – GIS Dataset. Available at https://www.data.wa.gov.au/

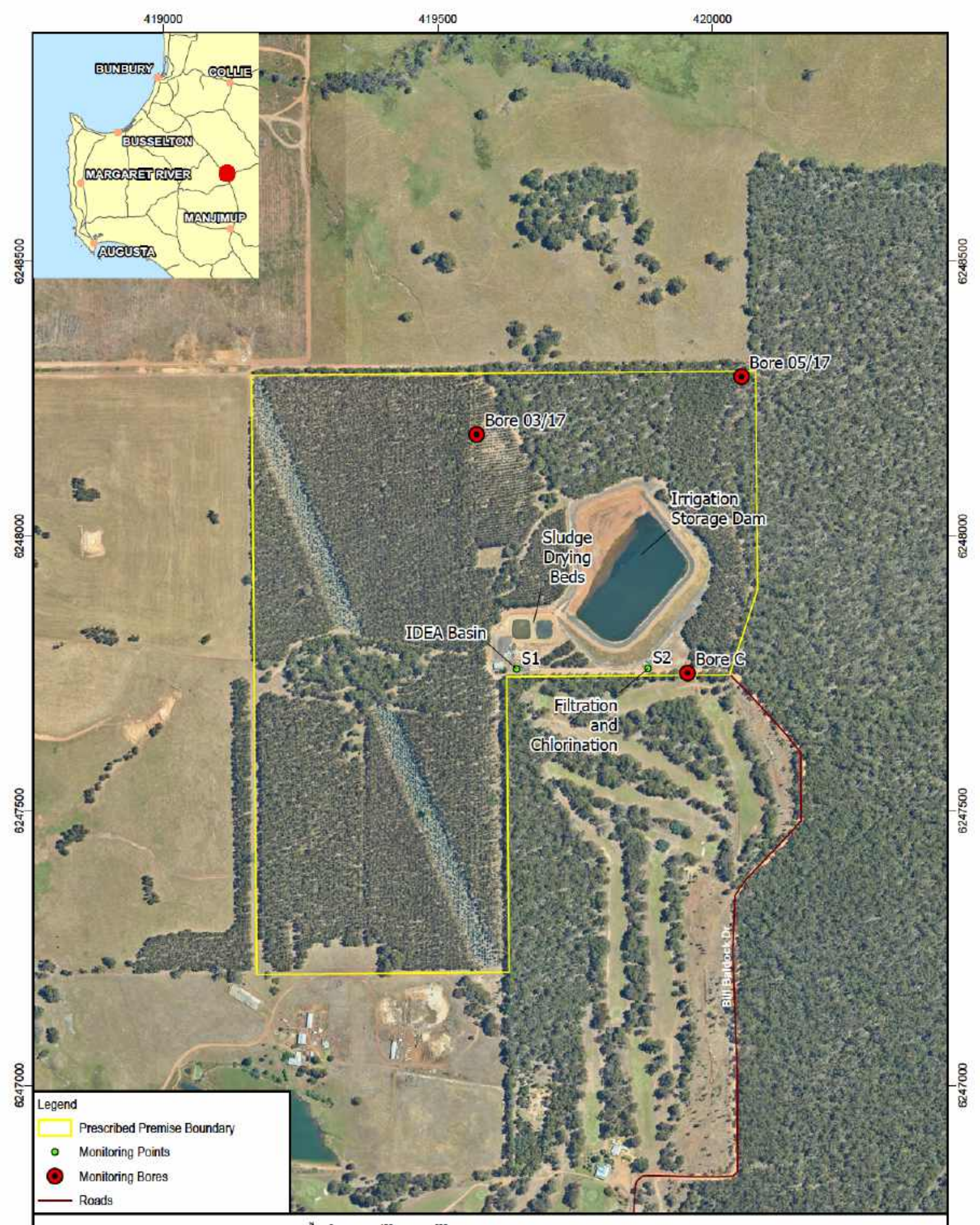
Fitzpatrick, Rob; Powell, Bernie; Marvanek, Steve (2011): Atlas of Australian Acid Sulphate Soils. v2. CSIRO. Data Collection. https://doi.org/10.4225/08/512E79A0BC589

Google Earth Pro. (2015). Google Earth Pro. Accessed March 2024.

Hearn, R. et al. (2002). Jarrah Forest 2 (JF2 – Southern Jarrah Forest subregion). Perth, Australia, Australia.

Metcalfe and Eddy, Inc. (2003). Wastewater Engineering: Treatment and Reuse. McGraw-Hill, New York.

Appendix A: Premises Maps (Attachment 2)



SLR

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N

0 100 200 Meters

Coordinate System:	GDA 1994 MGA Zone 50
Scale:	1:8,500 at A4
Project Number:	675.072415.00001
Date Drawn:	27/03/2024
Drawn by:	
Reviewed by:	

Service Layer Credits: Landgate / SLIP

Water Corporation

Bridgetown WWTP – Works Approval Application

Attachment 2: Premise Map

FIGURE 1

Path: H:\Projects-SLR\675-PER\675-PER\675.072415.00001 Bridgetown WWTP Upgrade\06 SLR Data\01 CADGIS\GIS\Bridgetown WWTP mapping\Bridgetown WWTP mapping.aprx

SLR

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N 0 10 20 Meters

Coordinate System:	GDA 1994 MGA Zone 50
Scale:	1:800 at A4
Project Number:	675.072415.00001
Date Drawn:	27/03/2024
Drawn by:	
Reviewed by:	

Service Layer Credits: Landgate / SLIP

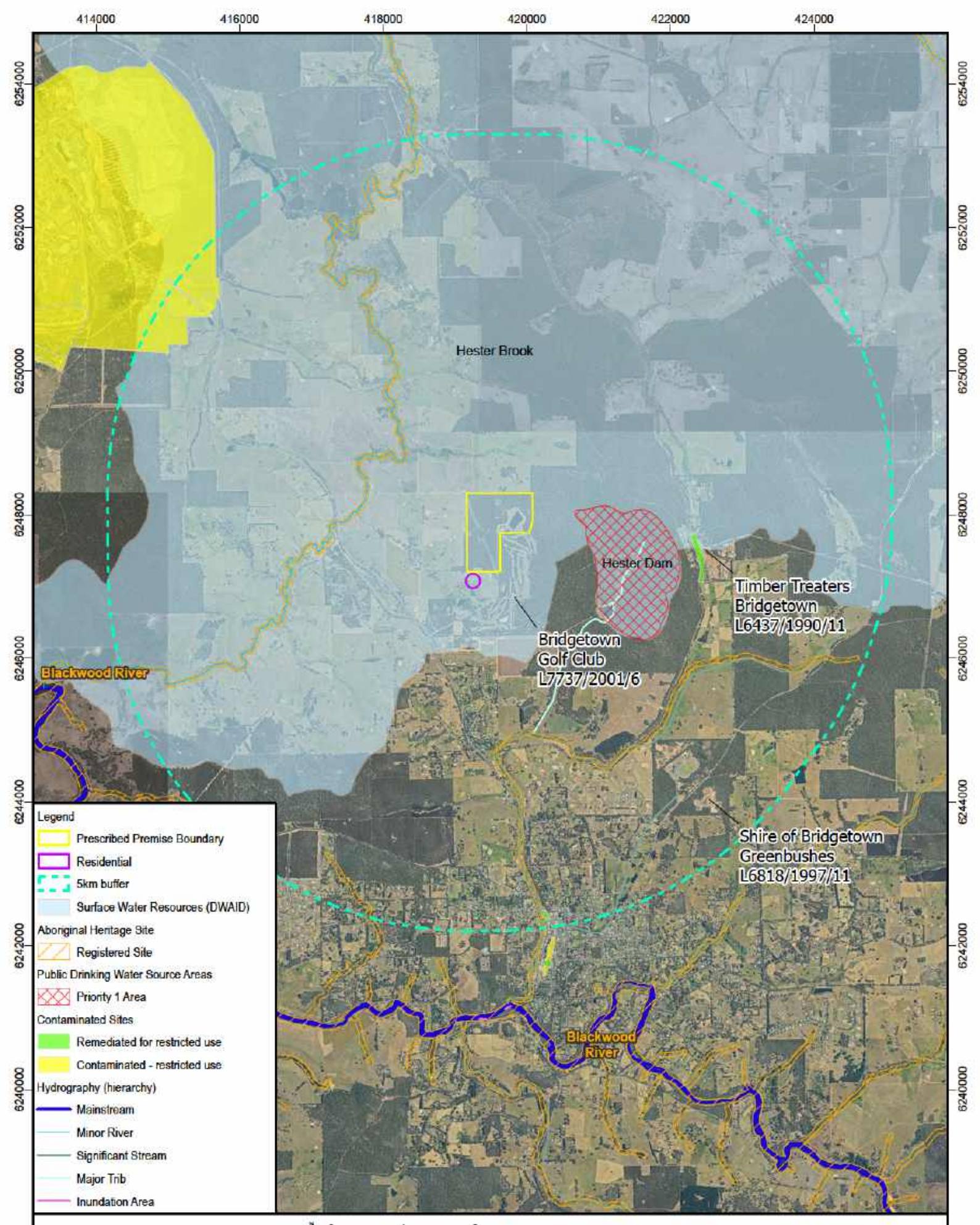
Water Corporation

Bridgetown WWTP – Works Approval Application

Attachment 2: Premise Map (Key Infrastructure)

FIGURE 2

Path: H:\Projects-SLR\675-PER\675-PER\675.072415.00001 Bridgetown WWTP Upgrade\06 SLR Data\01 CADGIS\GIS\Bridgetown WWTP mapping\Bridgetown WWTP mapping.aprx



SLR

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N

0 1 2 Km

Coordinate System:	GDA 1994 MGA Zone 50
Scale:	1:65,000 at A4
Project Number:	675.072415.00001
Date Drawn:	27/03/2024
Drawn by:	
Reviewed by:	

Service Layer Credits: Landgate / SLIP

Water Corporation

Bridgetown WWTP – Works Approval Application

Attachment 7: Siting and Location

FIGURE 3

Path: H:\Projects-SLR\675-PER\675-PER\675.072415.00001 Bridgetown WWTP Upgrade\06 SLR Data\01 CADGIS\GIS\Bridgetown WWTP mapping\Bridgetown WWTP mapping.aprx

Appendix B: Material Safety Data Sheets (MSDS)

Sodium Hypochlorite - Coogee Chemicals

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name	**Sodium Hypochlorite - Coogee Chemicals**
Synonym(s)	*Sodium Hypochlorite - Coogee Chemicals* 3600 - PRODUCT CODE • COOGEE SODIUM HYPOCHLORITE • HYPO 10 (FORMERLY) • HYPO 100 (FORMERLY) • HYPOCHLORITE SOLUTION • NORCHLOR • SODIUM HYPOCHLORITE (FORMERLY)

1.2 Uses and uses advised against

Use(s)	BLEACHING AGENT • DISINFECTANT • OXIDISING AGENT

1.3 Details of the supplier of the product

Supplier name	**COOGEE CHEMICALS PTY LTD**
Address	[redacted]
Telephone	
Fax	
Email	
Website	

1.4 Emergency telephone number(s)

Emergency	[redacted]

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

GHS Classification(s)

Corrosive to Metals: Category 1
Skin Corrosion/Irritation: Category 1B
Serious Eye Damage / Eye Irritation: Category 1
Aquatic Toxicity (Acute): Category 1
Contact with acids liberates toxic gas.

2.2 GHS Label elements

Signal word: **DANGER**

Pictograms

Hazard statement(s)

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H400	Very toxic to aquatic life.
AUH031	Contact with acids liberates toxic gas.

Prevention statement(s)

P234	Keep only in original packaging.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P264	Wash thoroughly after handling.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response statement(s)

P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTRE or doctor/physician.
P321	Specific treatment is advised - see first aid instructions.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P391	Collect spillage.

Storage statement(s)

P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.

Disposal statement(s)

P501	Dispose of contents/container in accordance with relevant regulations.

2.3 Other Hazards

None known.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS number	EC number	Content
SODIUM HYPOCHLORITE	7681-52-9	231-668-3	10 - 30%
SODIUM HYDROXIDE	1310-73-2	215-185-5	<1%
WATER	7732-18-5	231-791-2	>60%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use a Full-face Type B (Inorganic and acid gas) respirator or an Air-line respirator (in poorly ventilated areas). Apply artificial respiration if not breathing.
Skin	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.
Ingestion	For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.
First aid facilities	Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

Causes burns.

4.3 Immediate medical attention and special treatment needed

Treatment is symptomatic. Ingestion of hypochlorites releases hypochlorous acid which is irritating to the mucous membranes and skin but has low systemic toxicity. Buffer the acid by administering antacids.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Use an extinguishing agent suitable for the surrounding fire.

5.2 Special hazards arising from the substance or mixture

Non flammable. May evolve toxic gases (chlorine) when heated to decomposition.

5.3 Advice for firefighters

Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code

2X

2	Fine Water Spray.
X	Wear liquid-tight chemical protective clothing and breathing apparatus. Contain spill and run-off.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS. Clear area of all unprotected personnel. Ventilate area where possible. Contact emergency services where appropriate.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well ventilated area, removed from incompatible substances, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage, sealed when not in use, vented and stored upright. Check regularly for leaks or spills. Large storage areas should have appropriate ventilation systems.

7.3 Specific end use(s)

None known.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Chlorine (Peak Limitation)	SWA [AUS]	1	3	--	--
SODIUM HYPOCHLORITE	SWA [AUS]	1	3	--	--
Sodium hydroxide (peak limitation)	SWA [AUS]	--	2 (Peak)	--	--

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering Controls: Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended.

PPE

- Eye/Face: Wear splash-proof goggles.
- Hand: Wear PVC or rubber gloves.
- Body: Wear coveralls. When using large quantities or where heavy contamination is likely, wear rubber boots and a PVC apron.
- Respiratory: Where an inhalation risk exists, wear a Full-face Type B (Inorganic and Acid gas) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	CLEAR YELLOW LIQUID
Odour	CHLORINE ODOUR
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	> 100°C
Melting point	-25°C
Evaporation rate	NOT AVAILABLE
pH	> 11.5 (Neat)
Vapour density	NOT AVAILABLE
Relative density	1.17 to 1.22
Solubility (water)	SOLUBLE
Vapour pressure	2.3 kPa @ 20°C
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE

Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	80 % to 95 %

10. STABILITY AND REACTIVITY

10.1 Reactivity

Contact with acids may liberate toxic chlorine gas.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible (sometimes violently) with oxidising agents (e.g. peroxides), acids (especially hydrochloric - evolving chlorine gas), organic materials, reducing agents (e.g. sulphites), metallic powders, amines, ammonia and heat sources.

10.6 Hazardous decomposition products

May evolve toxic gases (chlorine) when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity — **Information available for the product:**

Ingestion may result in burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. Contact with acids may liberate toxic chlorine gas.

Information available for the ingredient(s):

Ingredient	Oral Toxicity (LD50)	Dermal Toxicity (LD50)	Inhalation Toxicity (LC50)
SODIUM HYPOCHLORITE	5800 mg/kg (mouse)	--	--

Skin	Contact may result in irritation, redness, pain, rash, dermatitis and possible burns.
Eye	Contact may result in irritation, lacrimation, pain, redness, corneal burns and possible serious eye damage.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT - single exposure	Over exposure may result in mucous membrane irritation of the respiratory tract, coughing and possible burns. High level exposure may result in ulceration of the respiratory tract and breathing difficulties. Over exposure to chlorine vapour may result in lung tissue damage. Do not mix with other chemicals unless advised and specific instructions provided, as toxic and irritating gases may be evolved.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure. Adverse effects are generally associated with single exposure.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Hypochlorites are extremely toxic to fish; Exposure to 0.5 % over 96 hours resulted in death of trout. Very toxic to aquatic life.

12.2 Persistence and degradability

Hypochlorites are non-persistent in the environment and there is no accumulation potential as they gradually decompose into a salt and oxygen.

12.3 Bioaccumulative potential

Hypochlorites are non-persistent in the environment and there is no accumulation potential as they gradually decompose into a salt and oxygen.

12.4 Mobility in soil

May leach to groundwater with resultant toxicity to aquatic organisms.

12.5 Results of PBT and vPvB assessment

No information provided.

12.6 Other adverse effects

LIQUID POLYALUMINIUM CHLORIDE

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name: **LIQUID POLYALUMINIUM CHLORIDE**

Synonym(s): LIQUID POLYALUMINIUM CHLORIDE (MEGAPAC 10) (FORMERLY) • MEGAPAC 10 - PRODUCT CODE • POLYALUMINIUM CHLORIDE, ALUMINIUM HYDROXIDE CHLORIDE

1.2 Uses and uses advised against

Use(s): WATER TREATMENT

1.3 Details of the supplier of the product

Supplier name: **OMEGA CHEMICALS**

Address [redacted]
Telephone
Fax
Email
Website

1.4 Emergency telephone number(s)

Emergency [redacted]

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

GHS Classification(s):
Acute Toxicity: Oral: Category 4
Skin Corrosion/Irritation: Category 2
Serious Eye Damage / Eye Irritation: Category 2A

2.2 GHS Label elements

Signal word: **WARNING**

Pictograms:

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.

Prevention statement(s)

P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response statement(s)

P301 + P312	IF SWALLOWED: Call a POISON CENTRE or doctor/physician if you feel unwell.
P302 + P352	IF ON SKIN: Wash with plenty of water.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P321	Specific treatment is advised - see first aid instructions.
P330	Rinse mouth.
P362 + P364	Take off contaminated clothing and wash it before reuse.

Disposal statement(s)

P501	Dispose of contents/container in accordance with relevant regulations.

2.3 Other Hazards

None known.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS number	EC number	Content

LIQUID POLYALUMINIUM CHLORIDE

Ingredient	CAS number	EC number	Content
ALUMINIUM CHLORIDE, BASIC	1327-41-9	215-477-2	33%
NON HAZARDOUS INGREDIENTS	Not Available	Not Available	Remainder

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation	If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.
Skin	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water.
Ingestion	For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.
First aid facilities	Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically. Chronic ingestion of this product may cause a phosphate deficiency.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Use an extinguishing agent suitable for the surrounding fire.

5.2 Special hazards arising from the substance or mixture

Non flammable. May evolve toxic gases if strongly heated. May evolve hydrogen chloride gas when heated to decomposition.

5.3 Advice for firefighters

Treat as per requirements for surrounding fires. Evacuate area and contact emergency services. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code

None allocated

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well ventilated area, removed from moisture, incompatible substances, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.

7.3 Specific end use(s)

None known.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Aluminium & compounds	SWA [Proposed]	--	1	--	--

LIQUID POLYALUMINIUM CHLORIDE

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Aluminium, soluble salts (as Al)	SWA [AUS]	--	2	--	--

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering Controls: Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended.

PPE

- Eye/Face: Wear splash-proof goggles.
- Hand: Wear PVC or rubber gloves.
- Body: When using large quantities or where heavy contamination is likely, wear coveralls.
- Respiratory: Wear a Class P2 (metal fume) / N95 respirator. Where an inhalation risk exists, wear a Type B (acid gas) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS TO SLIGHTLY CLOUDY LIQUID
Odour	MILD ODOUR
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	NOT AVAILABLE
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	2.5 to 3.5
Vapour density	NOT AVAILABLE
Relative density	1.17 to 1.18
Solubility (water)	SOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

None known.

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g. hypochlorites) and alkalis (e.g. sodium hydroxide).

10.6 Hazardous decomposition products

May evolve hydrogen chloride gas when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity — **Information available for the product:**

Harmful if swallowed.

Information available for the ingredient(s):

Ingredient	Oral Toxicity (LD50)	Dermal Toxicity (LD50)	Inhalation Toxicity (LC50)
ALUMINIUM CHLORIDE, BASIC	> 2000 mg/kg (rat)	> 2000 mg/kg (rat)	--

Skin	Contact may result in irritation, redness, pain and rash.
Eye	Contact may result in irritation, lacrimation, pain and redness.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT - single exposure	Over exposure may result in mucous membrane irritation of the respiratory tract, coughing, nausea, dizziness and headache.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure. Adverse effects are generally associated with single exposure.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No information provided.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

No information provided.

12.5 Results of PBT and vPvB assessment

No information provided.

12.6 Other adverse effects

No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal	For small amounts, absorb with sand, vermiculite or similar and dispose of to an approved landfill site. Contact the manufacturer/supplier for additional information if disposing of large quantities (if required). Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE, IMDG OR IATA

	Land Transport (ADG)	Sea Transport (IMDG/IMO)	Air Transport (IATA/ICAO)
14.1 UN number	None allocated	None allocated	None allocated
14.2 UN proper shipping name	None allocated	None allocated	None allocated
14.3 Transport hazard classes	None allocated	None allocated	None allocated
14.4 Packing group	None allocated	None allocated	None allocated

14.5 Environmental hazards No information provided.

14.6 Special precautions for user

Hazchem Code None allocated

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule: A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications: Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

Inventory listing(s): **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**
All components are listed on AIIC, or are exempt.

15.2 Chemical safety assessment

No information provided.

16. OTHER INFORMATION

Additional information:

RESPIRATORS: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Abbreviations:

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia

TLV	Threshold Limit Value
TWA	Time Weighted Average

Report Status

This ChemAlert report has been independently compiled by RMT's scientific department utilising the original Safety Data Sheet ('SDS') for the product provided to RMT by the manufacturer. The information is based on the latest chemical and toxicological research and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. It is an independent collation by RMT of information obtained from the original SDS for this product. Its content has not been authorised or verified by the manufacturer / distributor of the chemical to which it relates.

This ChemAlert report does not constitute the manufacturer's original SDS and is not intended to be a replacement for same. It is provided to subscribers of ChemAlert as a reference tool only, is not all-inclusive and does not represent any guarantee as to the properties of the product. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this ChemAlert report, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this ChemAlert report.

Prepared By

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Last Reviewed:	06-May-2024
Date Printed:	05-Nov-2024
Based on SDS dated:	22-Apr-2022

End of Report

Avoid contamination of non-target waterways.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal: Add to a large volume of reducing solution (eg thiosulphate, metabisulphite, but not carbon, sulphur or strong reducer) and acidify with 3M sulphuric acid. When reduction is complete, add mixture to water and neutralise. Absorb with sand or similar non-combustible material and dispose of to an approved landfill site. Contact the manufacturer/supplier for additional information (if required).

Legislation: Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	Land Transport (ADG)	Sea Transport (IMDG/IMO)	Air Transport (IATA/ICAO)
14.1 UN number	1791	1791	1791
14.2 UN proper shipping name	HYPOCHLORITE SOLUTION		
14.3 Transport hazard classes	8	8	8
14.4 Packing group	III	III	III

14.5 Environmental hazards: Marine Pollutant.

14.6 Special precautions for user

Hazchem Code	2X
GTEPG	8A1
Specific EPG	8.0.004
EmS	F-A, S-B

Other information: The environmentally hazardous substance mark is not required when transported in packages of less than 5 kg/L (UN Model Regulations: Special Provision 375; IATA: Special Provision A197; IMDG: Special Provision 969).

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule: S5 - Classified as a Schedule 5 Poison using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications: Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

Inventory listing(s): **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**

All components are listed on AIIC, or are exempt.

15.2 Chemical safety assessment

No information provided.

16. OTHER INFORMATION

Additional information:

RESPIRATORS: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES: Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: Strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report Status

This ChemAlert report has been independently compiled by RMT's scientific department utilising the original Safety Data Sheet ('SDS') for the product provided to RMT by the manufacturer. The information is based on the latest chemical and toxicological research and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. It is an independent collation by RMT of information obtained from the original SDS for this product. Its content has not been authorised or verified by the manufacturer / distributor of the chemical to which it relates.

This ChemAlert report does not constitute the manufacturer's original SDS and is not intended to be a replacement for same. It is provided to subscribers of ChemAlert as a reference tool only, is not all-inclusive and does not represent any guarantee as to the properties of the product. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this ChemAlert report, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this ChemAlert report.

Prepared By

[redacted]

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End of Report